Express Mail Label Number ER185708016US

UNITED STATES PATENT APPLICATION

For

INTERACTIVE SOUND PRODUCING TOY

Inventor:
Arne Schulze

The Law Office of Richard S. Erbe
Post Office Box 418
Simi Valley, California 93062-0418
(805) 522-7636

Attorney Matter No. P03-SCHUL-0057
Sheets of Drawings: 3

CERTIFICATE OF MAILING

I hereby certify that this correspondence is being deposited with the United States Postal Service as Express Mail in an envelope addressed to Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia, 22313 on September 30, 2003.

Signature: Marion I Erbe

Name: *Marion I. Erbe*
Date: *September 30, 2003*

INTERACTIVE SOUND PRODUCING TOY

RELATED APPLICATIONS

[0001] Not applicable.

BACKGROUND OF THE INVENTION

[0002] *Field of the Invention:* The present invention relates generally to producing audio in response to stimuli, and more particularly to generating a recognizable sound or series of sounds to simulate a voice in synchronization with animation, such as with a manually controlled puppet figure.

[0003] *General Background and State of the Art:* Novelty items, such as greeting cards, toys and puppets which have mouths or opposed moving members and which are also capable of producing voice-like sounds are known in the art. One of the primary objects of such items is to give the user the impression that the item is actually "speaking" or producing audible sounds in conjunction with the movement of the mouth or jaws as they are moved by the user and thus providing the user with some degree of control over the audible events produced by the toy or puppet.

[0004] For example, U. S. Patent No. 4,768,232 to Milner discloses a hand-held puppet figure configured to simulate an animal, and a sound-producing circuit having a speaker that responds to the action of opening and closing the mouth of the puppet by means of a photosensitive sensor. The circuit produces a synthesized nonverbal sound, capable of simulating barking, quacking, or the like, that commences upon the opening of the mouth and ends when the mouth closes.

[0005] U. S. Patent No. 5,651,716 to Mowrer, et al., discloses a sound modulating toy figure that includes resilient jaw members movable between open and closed positions. The jaw members are operated by using a manual lever-type actuator. The toy also includes a sound-producing unit including a speaker. The operator of the toy pushes a manual switch to activate the sound-producing unit thereby producing an audible sound. A muffler mounted near the speaker muffles the sound when the jaw members of the toy are closed and allows substantially all of the sound to emanate from the speaker when the jaw members are opened.

[0006] U. S. Patent No. 5,447,461 to Liao discloses a sound generating hand puppet, which includes a glove worn by a player and a mouth-manipulating device secured in the head portion of the puppet glove. A sound generator mounted in the puppet is activated by operation of the mouth-manipulating device, which simulates opening the mouth of the puppet. This operation produces a sound imitating an animal or person's cry.

[0007] U. S. Patent No. 6,394,874 to Kubo, et al., discloses a sound-generating finger puppet, which can be operated by a single hand. The figure includes a sound-producing unit within the puppet that is activated by pushing a button. The puppet does not include moving jaw members.

[0008] All of the above devices provide the user with an enjoyable experience by combining animation of the toy figure with sound, adding some aspect of realism to the game being played with the device.

[0009] However, these prior art devices do not provide fully synchronized verbal audio content with the animation of the toy or other novelty item. In the real world, when a user manipulates the mouth or jaw elements of the item, the mouth may be open for a very short duration or a long duration, or somewhere in between, depending on the whim of the user, or the type of game being played. Thus, to truly simulate the synchronization of physical animation with verbal sound, the sound producing unit of the item would have to be capable of responding to a variety of length of animation events, so that the sound event commences with the opening of the mouth or jaw elements of the figure, continues for the period of time that the mouth or jaw elements are open, and ends naturally as the mouth or jaw elements are closing, with the natural syllable tail end and sound decaying in amplitude as does a natural speaking or singing voice when a speaker's or singer's mouth is closed.

[0010] Thus, there has long been a need for a sound producing novelty item that combines truly synchronized sound and animation that provides the impression that the item is actually "speaking" or "singing" as the sound commences upon animating the item, continues for as long as the animation continues, and ends naturally.

[0011] None of the above patents, taken either singly or in combination, is seen to describe the present invention as disclosed and claimed.

SUMMARY OF THE INVENTION

[0012] Accordingly, it is an object of the invention to provide a novelty item or toy figure having movable members that produce sound as the members are moved to simulate that audio is emanating from the item's moving members.

[0013] Another object of the invention is to provide a novelty item or toy figure having movable members, which produces sound in complete synchronization as the item's members are both opened and closed.

[0014] A further object of the invention is to provide a novelty item or toy figure having a head portion with movable members whereby animating the movable members, a prerecorded audio event is actuated.

[0015] It is also an object of the invention to provide a novelty item or toy figure having a controllable vocal synchronization between audio and animation when opening and closing the mouth of the item thereby actuating a visually correct vocal performance with total control of each syllable length and thereby the vocal performance tempo.

[0016] Yet another object of the invention is to provide a novelty item or toy figure having a mouth and a sound-producing unit that uses sustainable looped vowels where all syllables are time length manually controllable by a player.

[0017] A further object of the invention is to provide a toy figure or novelty item having a mouth and a sound producing unit where the sequence of audio events are actuated and controlled by opening and closing the item's mouth manually thus resulting in an animated sequence for each and every syllable pronounced in the speech or song within a prerecorded digital audio file.

[0018] These and other objectives are achieved by the present invention, which, in a broad aspect, provides the user with a sound-producing apparatus for use in conjunction with a toy in the form of a puppet having hand-movable parts simulating animation to provide controllable sound that is synchronized with the manually controlled animation of the puppet. The invention includes a switch configured so as to produce a signal when certain hand-movable parts are moved that actuates a sound-producing unit mounted within the toy. The sound-producing unit produces an audio event that, when applied to a speaker, produces sound controllable by hand movements and coordinated to the animation of the puppet.

[0019] In the preferred embodiment of the invention a switch is mounted in the puppet's mouth. The switch activates a sound producing unit in the form of a sound chip on which is stored a number of audio events in the form of syllables that, as the audio events are activated in sequence, produce a recognizable phrase, poem, or song through a speaker mounted in the puppet. Each of the audio events or syllables is made up of three distinctive parts: a beginning or attack portion that is activated as the mouth of the puppet opens, a looped portion that continues for as long as the mouth is open, and an end portion that is activated as the mouth closes and provides a natural decay of the sound event or syllable.

[0020] A supply voltage control circuit produces the operating voltage for the electronic circuits used to implement the invention. The control circuit is structured to respond to the signal produced by the switch.

[0021] A principal advantage provided by the invention is found in the realism afforded a child's toy or other amusement device having movable parts to simulate animation. With the present invention, a player can produce recognizable verbal sounds that are truly synchronized with the movement of the toy or device.

[0022] Another advantage of the present invention is that the recognizable verbal sounds are synchronized with the movement of the moving parts of the toy or device regardless of the time lapse of the movement of the parts, i.e., realistic synchronization of the movement of parts and the sounds emanating from the invention whether the movement of the parts is done rapidly or slowly, without adjusting any parts of the toy.

[0023] Further objects and advantages of this invention will become more apparent from the following description of the preferred embodiment, which, taken in conjunction with the accompanying drawings, will illustrate, by way of example, the principles of the invention.

BRIEF DESCRIPTION OF THE DRAWINGS

[0024] The accompanying drawings illustrate the invention. In such drawings:

[0025] FIG. 1 is a simplified diagram of the present invention illustrating its use with a puppet;

[0026] FIG. 2 is a schematic diagram of an audio event generated by the sound producing unit of the present invention; and

[0027] FIG. 3 is block diagram of the sound-producing unit.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS OF THE INVENTION

[0028] In the following description of the present invention, reference is made to the accompanying drawings, which form a part thereof, and in which are shown, by way of illustration, an exemplary embodiment illustrating the principles of the present invention and how it may be practiced. It is to be understood that other embodiments of the invention may be utilized to practice the present invention and structural and functional changes may be made thereto, without departing from the scope of the present invention.

[0029] A sound producing apparatus of the present invention is illustrated as a toy figure in FIG. 1, where the toy figure is generally referred to by the reference numeral 10. Toy 10 includes head 12, which can take the form of a living being, such as an animal, fantasy figure, or a human. In an alternative embodiment of the invention, head 12 may be embodied in a glove (not shown), which can be worn on a hand and used in conjunction with any mouth controllable hand puppet. Head 12 includes opposed resilient jaw members 14 and 16 which may be operated manually by someone playing with the toy, either by inserting a hand inside head 12 or by means of a manual actuator mounted within head 12. Jaw members 14 and 16 are biased to generally remain adjacent to each other when they are not activated.

[0030] Toy 10 further includes sound producing unit 20, which is illustrated in FIG. 3. Sound producing unit 20 includes sound chip 22, on which is mounted a memory 24, which may take the form of, for example, a memory chip, a ROM cartridge, or a flash RAM card, and processing unit 26. Memory 24 contains a plurality of stored audio events, which, in the preferred embodiment of the invention, are comprised of verbal syllables arranged in sequences to produce recognizable songs, poems, or phrases.

[0031] When the player begins manually animating toy 10 by moving jaw members 14 and 16, switch 18 sends a signal to sound producing unit 20 to initiate audio event 34, which is stored on sound chip 22. In one embodiment of the invention, audio event 34 is comprised of a syllable with two distinctive parts, a first or attack portion and a second

portion. The first portion of the two-part audio event 34 is a sustained sound with an attack, which occurs as the jaw members 14 and 16 are opened. The second portion of the two-part audio event 34 is a new sound file of a natural tail or decaying sound that would smoothly cross-fade and decay as the mouth closes.

[0032] An audio event 34 of the preferred embodiment of the invention is illustrated in FIG. 2 and is illustrative of the many audio events that are stored in memory 24. Each audio event 34 is comprised of three distinctive parts, which are the attack portion 36, sustainable loop portion 38, and end portion 44. As the jaw members 14 and 16 begin to open, switch 18 initiates attack portion 36 as the mouth of toy 10 opens. During the time that the mouth remains open (when jaw members 14 and 16 are positioned away from each other), attack portion 36 continues into loop start 40 of loop portion 38, which begins a sustained continuous sound of loop portion 38 for as long as jaw members 14 and 16 are in the open position. As jaw members 14 and 16 are moved adjacent to each other and the mouth closes, loop portion 38 transitions into loop end 42 and then to end portion 44, which provides a natural-sounding decay of the syllable sound, in a manner similar to the way in which a human voice might sound under the same circumstances.

[0033] To illustrate how a three-part audio event 34 actually occurs in the present invention, here is how the toy 10 would verbalize the word "cat". As jaw members 14 and 16 are activated by the user and moved away from each other, simulating the opening of the toy's mouth, switch 18 activates the attack portion of audio event 34, in this case the sound "caa". While the mouth remains open, attack portion 36 sequences into loop portion 38, which in the case of this audio event would produce the sound "aaaaaaaa..." for as long as the mouth remains open. When the user moves jaw members 14 and 16 adjacent to each other, simulating the closing of the toy's mouth, loop portion 38 sequences into end portion 44, which in the case of the present audio event would be the sound "t".

[0034] As the user continues to open and close jaw members 14 and 16, a sequence of audio events takes place, and familiar words in the form of songs, poems or phrases are "verbalized" by toy 10. A sequence of audio events for the phrase "Mary had a little lamb" is illustrated in the example below. In the example, transitions between the three

portions of the audio events are indicated by a slash "/", so the complete sequence of the three-part audio event 34 is in the form "xxx/yyyyyy/zzz."

[mouth opens]Meh/hhhh/rrr[mouth closed]-[mouth opens]Ree/eeeee/Eh [mouth closed]-[mouth opens]Ha/hhhhh/D[mouth closed]-[mouth opens]Ah/hhhhh/H[mouth closed]-[mouth opens]Le/eee/H[mouth closed]-[mouth opens]Tah/hhhhh/L[mouth closed]-[mouth opens]La/hhhh/M[mouth closed]

[0035] By storing a number of different sequences of audio events in memory 24, a user can enjoy a wide variety of experiences by animating toy 10. Selector switch 32, which is mounted on the outside of head 12, enables the user to select which sequence of audio events he or she would like to hear. In one aspect of the invention, there may be stored several different sequences of the same song in different keys, and/or in first, second, or third-part harmony. Thus, the user can use selector switch 32 to select the key in which the song is sung, and may also select a sequence for first, second or third part harmony of the same song. Alternatively, a pitch-shifting switch (not shown) may be added to the sound producing unit 20, to change the pitch of a selected sequence, rather than recording several versions of the same song in memory 24.

[0036] One of the advantages of the invention is that the toy can take on a variety of voices. The voices can be animal, fantasy, or human, male or female, young or old, and could also have accents or other characteristics.

[0037] Toy 10 also provides great versatility, in that country specific audio events can be stored in memory 24, such as audio events in the Japanese language for use of the invention in Japan, or audio events in the Spanish language for use in many Latin American countries.

[0038] In another embodiment of the invention, sound-producing unit 20 includes a sound chip with multiple polyphony, thereby enabling the use of an instrumental performance (i.e., strummed guitar chords, sustained piano chords, or sustained organ chords) synchronized with each three-part audio event 34. Each chord could be sustained through multiple syllables until the next chord change. The instrumental performances can be generated from a General MIDI PCM or FM sound-bank/engine.

[0039] If one or more users has toy 10 on one or both hands, the toys could be used to sing together either in unison or in multiple part harmony, providing yet another entertaining experience for the user(s).

[0040] Memory 24 could be manufactured so that it can be removed as a package from the toy 10 and replaced with a new memory that would contain prerecorded audio events that are different from those stored on the removed unit. This way, a user would always be able to have new audio events and would not easily get tired of using the toy.

[0041] The types of prerecorded audio events that in sequence produce performances are almost unlimited. I envision prerecorded performances such as vocal effects, educational songs, nursery rhymes, holiday songs, popular songs, animal voices, spoken words, prayers, poems, or robotic speech, among others.

[0042] In another embodiment of the invention, a novelty item such as a greeting card could be configured to synchronize verbal audio events in a sound-producing unit mounted to the card. The front and back parts of the greeting card function in the same manner as do the movable jaw members of the toy. As a person begins to open the card, a switch activates the sound producing, which initiates an audio event, which can be sustained while the card is opened and smoothly ends with a natural decay as the parts of the card are closed together.

[0043] The foregoing description of exemplary embodiments of the present invention have been presented for purposes of enablement, illustration, and description. It is not intended to be exhaustive of or to limit the present invention to the precise form discussed. There are, however, other configurations for sound producing toys not specifically described herein, but with which the present invention is applicable. The present invention should therefore not be seen as limited to the particular embodiments described herein; rather, it should be understood that the present invention has wide applicability with respect to sound producing toys. Such other configurations can be achieved by those skilled in the art in view of the description herein. Accordingly, the scope of the invention is defined by the following claims.